

In the Specification:

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Tool 35 is shown as planar and having a rectangular cross-section sized to have a larger lateral width than that of frame 13, though tool 35 can also be tapered when necessary for the desired shape. The oversize width, preferably 0.002" to 0.120" wider than frame 13, provides for a gap or clearance between frame 13 and inner surfaces 23 of legs 21 when frame 13 is inserted into clevis 20. Tool 35 is coated with Teflon on surfaces 37, 39 to ensure a minimum of force is necessary to remove tool 35 after curing of preform 11. Surfaces 37, 39 contact peel ply 33 and shape the volume between legs 21. Semi-rigid over-presses 41 are used to distribute force applied to over-presses 41 across the width and height of preform 11, surfaces 43, 45 being in contact with over-wrap plies 31. Each over-press 41 is generally triangular in cross-section. Inner surfaces 43, 45 are perpendicular to each other, and the outer side is slightly concave. The distribution of force causes more consistent bonding at the interface of skin 15 and preform 11 and a more consistent shaping of clevis 20 to the shape of tool 35.

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Referring to FIG. 2, after curing, vacuum bag and over-presses 39 41 are removed. Tool 35 is removed from clevis 20, and peel ply 33 is peeled from inner surfaces 23 and surface 25.

An adhesive 47 that is preferably in a paste form, for example, Hysol® EA 9394, available from Dexter Adhesive Systems of Bay Point, CA, is injected into clevis 20, and the outer surfaces 49, 51 of frame are wetted with additional adhesive 47. EA 9394 has a maximum peel strength of 20 pounds per linear inch, placing it in the range of the adhesives. Adhesive 47 is thickened into a paste form by adding a thickening agent, causing adhesive 47 to have a high enough viscosity to prevent adhesive 47 from flowing out of clevis 20 even when preform 11 is turned upside down. Frame 13 is inserted into clevis 20, adhesive 47 filling the gap between inner surfaces 23 of legs 21 and surfaces 49 of frame 13 and between surface 25 of preform 11 and surface 51 of frame 13. Since the amount of oversizing of tool 35 determines the amount and thickness of adhesive

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47 remaining between frame 13 and inner surfaces 23 after insertion of frame 13, the width of tool 35 will be determined from the assembly tolerance requirements and by the strength required in the joint. Mechanical pressure is applied to maintain the proper positioning of parts 13, 15, and adhesive 47 is cured to form a bonding layer between cured preform 11 and frame 13. Though EA 9394 cures at room temperature, local heat can be applied when necessary to cure the paste adhesive used. FIG. 2 shows a completed assembly, frame 13 being secured to skin 15.

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